

MODERN WAY FOR SECURE AUTHENTICATION

# BIOMETRIX

# THE OUTLINE

## LIST OF PRESENTATION

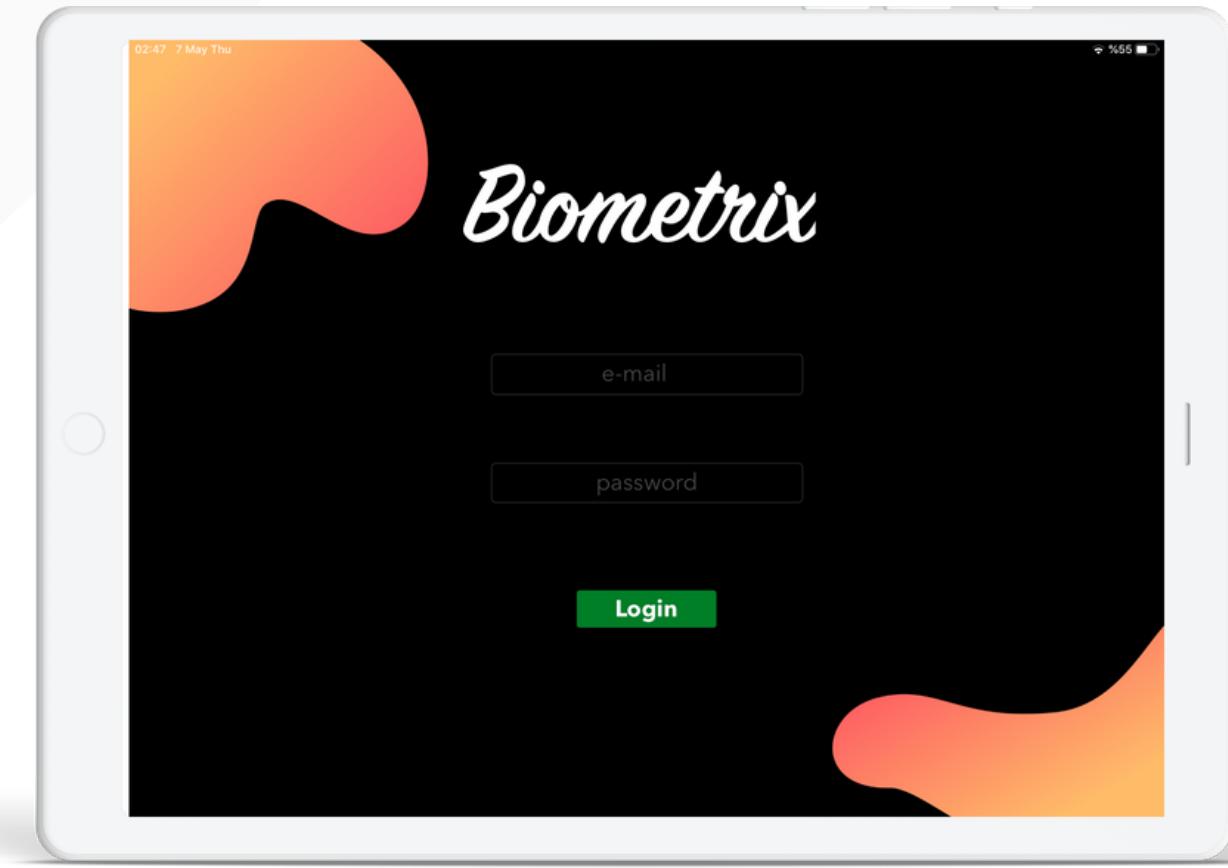
About  
Technology  
Future

# ABOUT

## Background and Workspaces

For a long time signature has always been associated with that of law requirement. The usage of a signature confirms the identity of every individual. It creates a legally binding contract or agreement between two or more parties.

Authentication of the user is enhancing very critical to do accessing data and business transactions. While many different techniques applied for authentication, biometrics authentication has been gaining among the industries that highly incorporate securities in their daily activities.



An accustomed way for

*Signature*.

Resistance for Forgeries

Secure Transactions

Paperless Workspaces

OUR  
MISSION





# SIGN DOCUMENTS

## FROM EVERYWHERE

With using Biometrix Mobile Application,  
prepare documents and  
sign your documents using your stylus.

The screenshot displays the Biometrix Admin Panel interface. At the top left, it says "Admin Panel". Below that, there are two cards: one for "Total Clients" (10) with a green icon and another for "Total Transactions" (14) with a yellow globe icon. The main section is titled "Latest Transactions" and contains a table with the following data:

TRANSACTION ID	CLIENT	USER
2070A241-EDB2-45F4-A2CD-BCD2A6949E52	9	taylanakbas@bx.com
13360141-BD39-4C19-96C6-A6AFA6DCBFCE	1	ta@bx.com
072FC533-D9D6-4090-9522-6233668CA664	1	ta@bx.com
D2C130CB-98C7-45E9-87AD-FB43C6908003	1	ta@bx.com
E286BE8D-B7BE-4EAD-8A02-719886F2DA84	4	taylanakbas@bx.com
5EA46ACB-FF56-408D-9739-57641A53C4CD	9	taylanakbas@bx.com
3696931A-C9C9-4DCF-B1CF-5AFBB3A24E07	9	taylanakbas@bx.com
CC85A38F-B22F-459D-A164-BF15B448F4D8	1	taylanakbas@bx.com
D2E88D6B-D04B-4194-9E8E-71948F0F5046	1	ta@bx.com
60557B82-8C9E-4F81-BEEE-28233F9B2DB1	1	ta@bx.com
A1E62FC9-A7D7-4632-A11F-4553B8F8F8A6	6	taylanakbas@bx.com

# MANAGE YOUR TRANSACTIONS

## Biometrix Admin Panel

Monitor transactions

Generate detailed reports

Designed for Administrative Users

# OUR TECHNOLOGY

advanced statistical  
methods

state of art level  
security



# BIOME TRIX

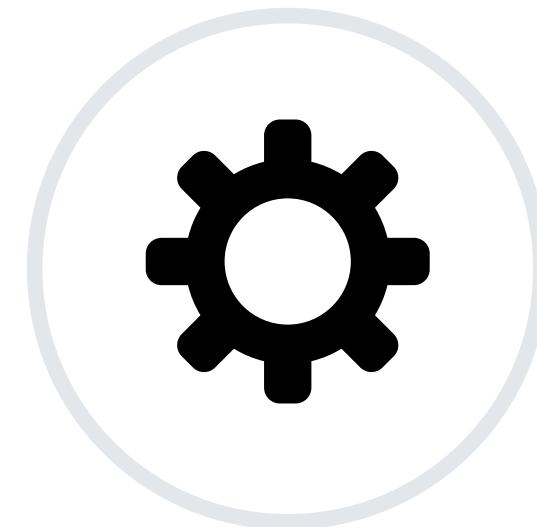


# PROCESSES

for Signature Verification



CAPTURE



EXTRACT



COMPARE

# capturing

## 1 SELECT DOCUMENT

Select a document or  
create new one.

## 2 SELECT ID

Identification is related with  
client's signature model that  
created previously.

## 3 SIGN

Client puts own signature on  
device using stylus. Dynamic  
features captured by the app  
such as location, speed or stylus  
angles.

## NORMALIZE COORDINATES

Signer can start anywhere from display of device.

## LOCAL FEATURES

Calculates local features using coordinates, velocity and acceleration, pressure, azimuth & altitude angle and more.

## SMOOTH

Since devices may have a low resolution, we used filters for smoothing.

## FEATURE NORMALIZATION

Normalizes all local features in a small interval.

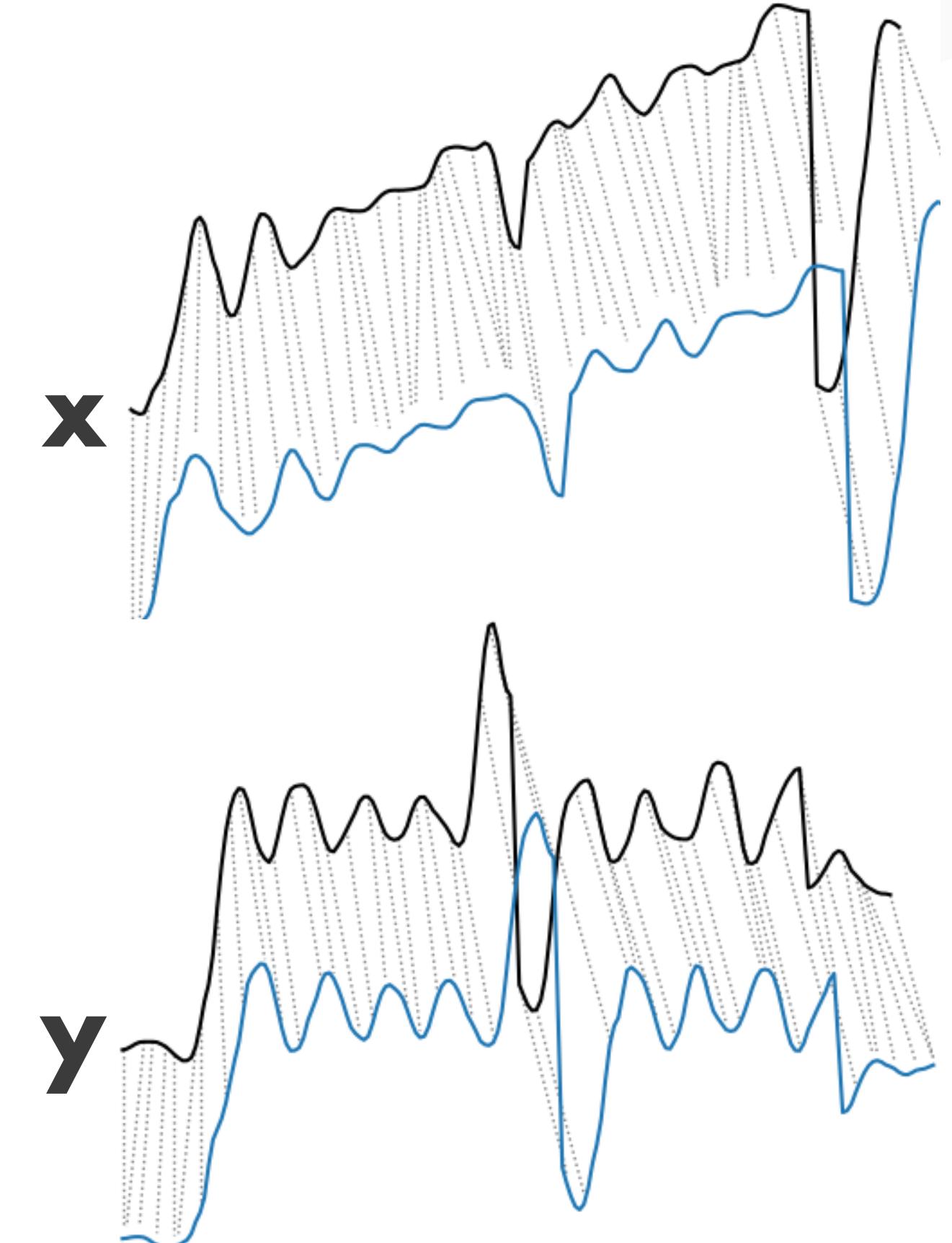
# extracting

# compare with **DYNAMIC TIME WARPING**

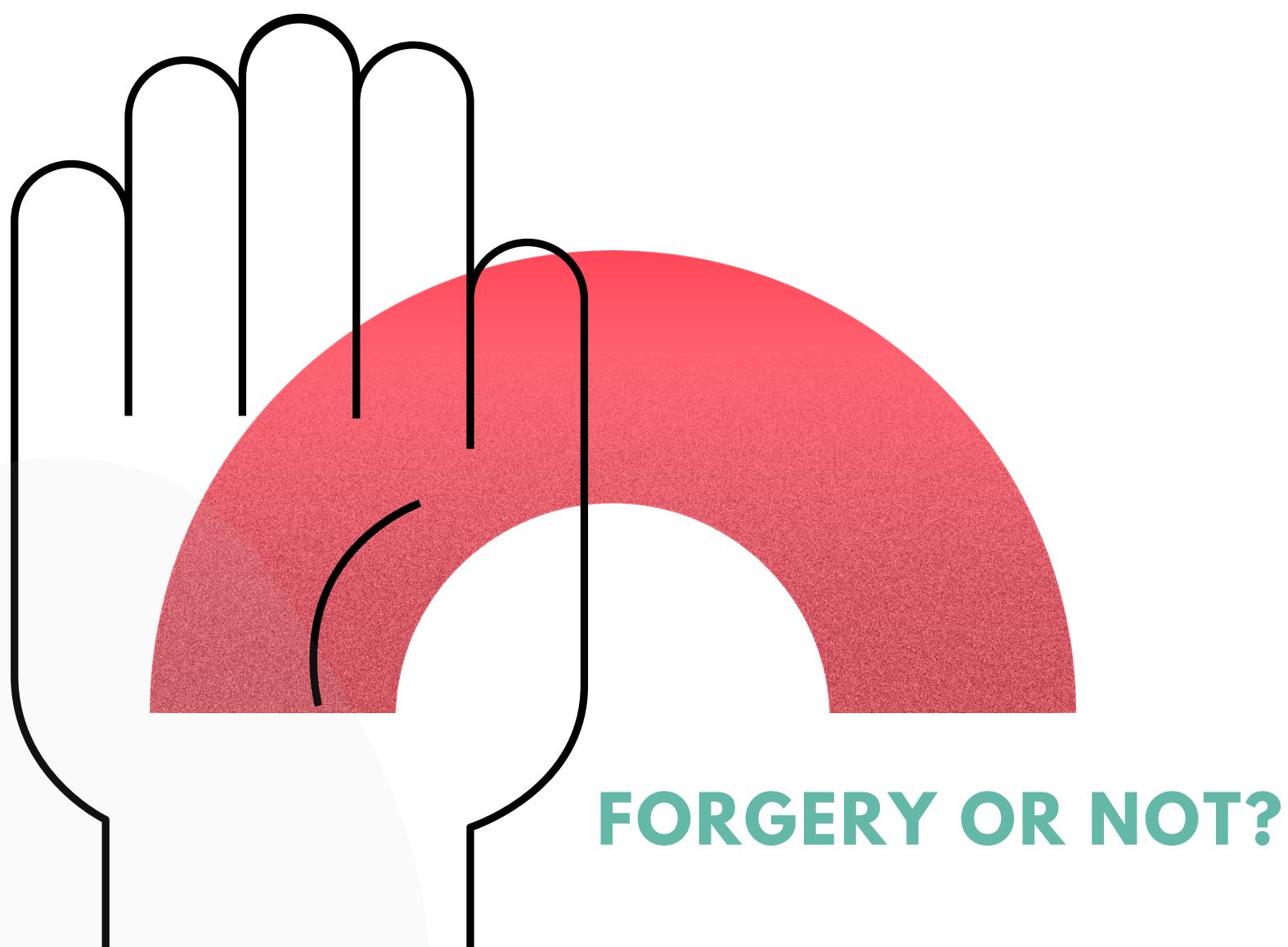
The objective of time series comparison methods is to produce a distance metric between two input time series.

The similarity or dissimilarity of two time series is typically calculated by converting the data into vectors and calculating the Euclidean distance between those points in vector space.

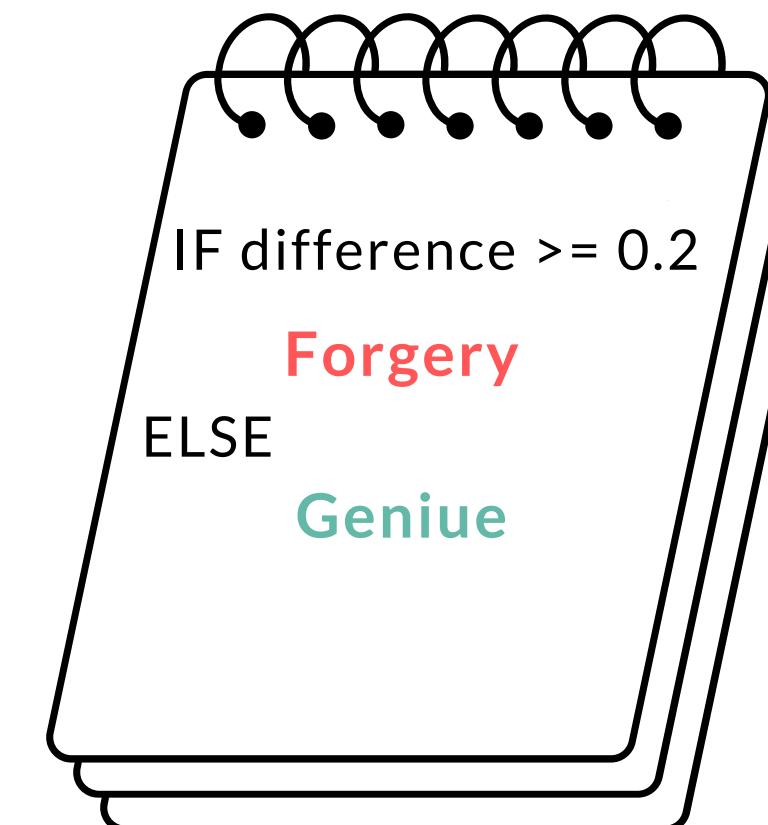
Dynamic time warping is a time series comparison technique that has been used for speech and word recognition since the 1970s with sound waves as the source.



# IDENTIFICATION & VERIFICATION



To calculate the verification score of the test signature, Biometrix makes a similarity calculation between test signature and each signature in the model. Average of similarities gives the score of test.



93%

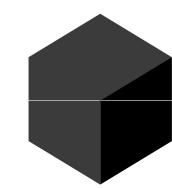
According to our test result  
7% Equal Error Rate (EER)  
is for Biometrix system

To test our verification system, we  
collected signatures for 5 different  
signers after create their model.

**10 real** signatures  
**10 professional forged** signatures  
**10 random forgery** signatures

**SUCCESS RATE**

# MODEL GENERATION



*Signature*



## Capture

5 different signature

**Location**  
**Pressure**  
**Speed**  
**Acceleration**  
**Altitude**  
**Azimuth**  
**Timestamp**

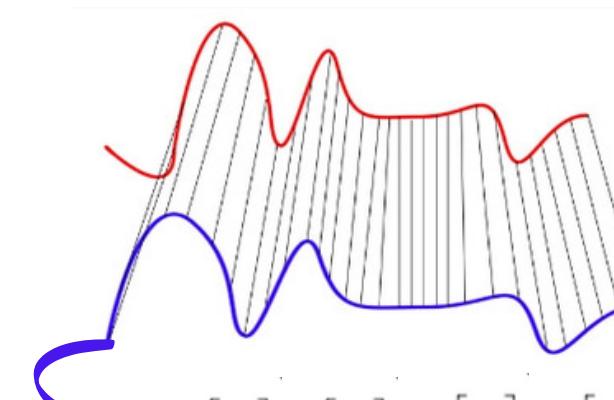
## Extract

20 local features

x(t)	acc(t)
y(t)	at(t)
p(t)	p'(t)
altitude(t)	a(t)
azimuth(t)	sina(t)
v(t)	cosa(t)
vx(t)	a'(t)
vy(t)	sina'(t)
ax(t)	cosa'(t)
ay(t)	$\beta(t)$

## Compare

Each signature



$x$	$x$	$x$	$x$
$y$	$y$	$y$	$y$
$p$	$p$	$p$	$p$
$v_x$	$v_x$	$v_x$	$v_x$
$v_y$	$v_y$	$v_y$	$v_y$
$v$	$v$	$v$	$v$
$a_x$	$a_x$	$a_x$	$a_x$
$a_y$	$a_y$	$a_y$	$a_y$
$a$	$a$	$a$	$a$
:	:	:	:

## Calculate Threshold

$$T_i = \frac{\sum_{n=1}^{10} similarity_n}{10}$$

## Create Block

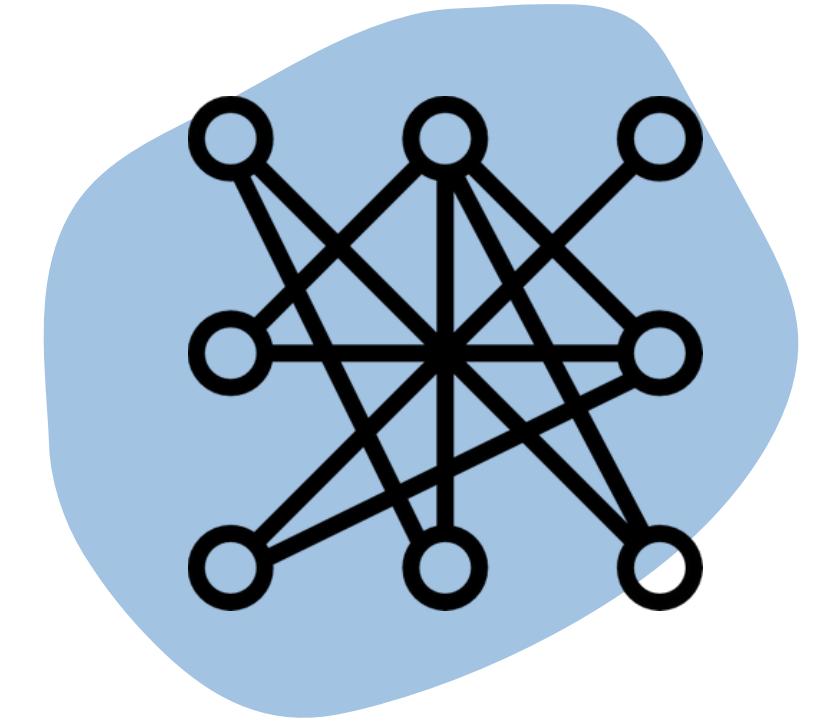
This step demonstrates how we can store our sensitive data. When a new user model created. Our API generates a custom structure that consists of model data. Then it creates a new block and adds to blockchain

store your sensitive data on  
**BLOCKCHAIN**



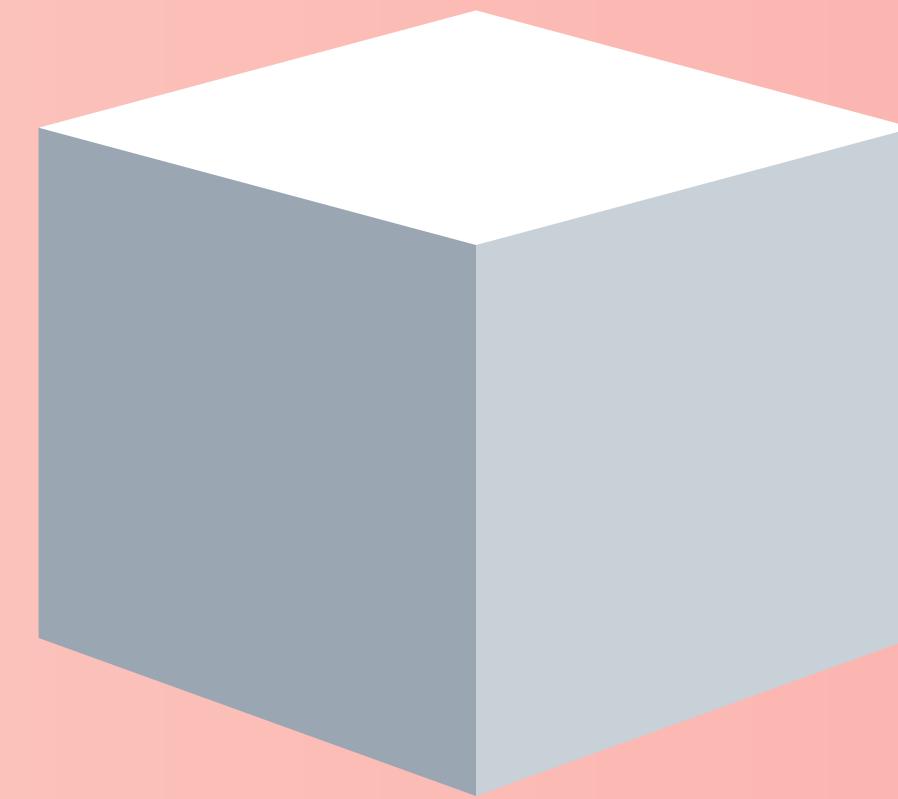
INTEGRITY

DECENTRALIZED  
NETWORK



SMART  
CONTRACTS

# A NEW BLOCK



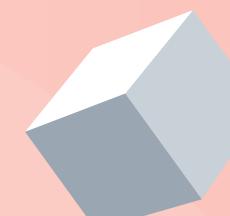
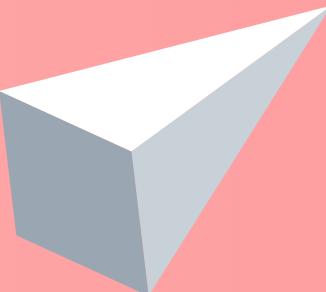
## BLOCK DATA

Previous Hash  
Timestamp  
Proof  
Index



## CLIENT DATA

5 Signature  
Threshold  
ID





# TRANSACTIONS

TRANSACTION ID  
CLIENT ID  
LIMITED END-USER ID  
TIMESTAMP  
DIGITIZED SIGNATURE DATA  
SIGNATURE IMAGE  
VERIFICATION RESULT  
VERIFICATION ANALYSIS  
LOCATION  
SIGNER IMAGE

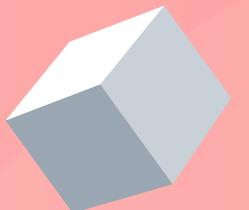
# FUTURE WORK

## TARGET MARKET

Almost all companies, organizations and/or government offices need authentication methods and biometric signature is exactly what they are looking for.

## OPERATIONS

Provide fully-automatic service for our clients



# PROJECT TEAM

**TAYLAN AKBAS**

Computer Engineering  
Student

*advisor*

**AHMET KOLTUKSUZ**

*Ph.D., Assoc. Prof.*



*Thank you!*

# CONTACT US

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